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मानक

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IS 7778-6 (2003): Small Tools Sampling Inspection Procedures, Part 6: Milling Arbors and Accessories [PGD 32: Cutting tools]



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“Knowledge is such a treasure which cannot be stolen”

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छोटे औजारों की नमूना निरीक्षण की प्रक्रिया
भाग 6 मिलिंग आरबर और एसेसरिस
(पहला पुनरीक्षण)

Indian Standard
SMALL TOOLS SAMPLING INSPECTION
PROCEDURES

PART 6 MILLING ARBORS AND ACCESSORIES

(*First Revision*)

ICS 25.100.20

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

FOREWORD

This Indian Standard (Part 6) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Drills, Reamers and Threading Tools Sectional Committee had been approved by the Basic and Production Engineering Division Council.

This standard was first published in 1975. In the light of experience gained over the years, in this revision following changes have been incorporated:

- a) Definition of various terminologies used in the standard have been aligned with the practice followed at ISO level,
- b) Scale of sampling and criteria of conformity have been modified,
- c) Classification of non-conformities for various type of cutting tools have been updated, and
- d) To cater the specific need of the different industries and to make this standard user friendly, this standard has been splitted in 11 Parts for easy adoption/acceptance and guide updation.

This standard has been prepared based on prevalent practice and experience available in the Indian Industries. While formulating this standard considerable assistance has been derived from IS 2500 (Part 1) : 2000 'Sampling inspection procedures: Part 1 Attribute sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection (*third revision*)'. IS 7778 'Small tools sampling inspection procedures' is now being published in following 11 Parts. Other parts of the standard are given below:

- | | |
|---------|---|
| Part 1 | Twist drills, countersinks and counterbores |
| Part 2 | Reamers |
| Part 3 | Sleeves, sockets and adaptors |
| Part 4 | Screwing taps, dies and knurling tools |
| Part 5 | Milling cutters |
| Part 7 | Gear cutting tools and broaches |
| Part 8 | Saws |
| Part 9 | Single point (HSS and carbide tipped) tools |
| Part 10 | Carbide tips and indexable inserts |
| Part 11 | Hard metal burrs |

Indian Standard

SMALL TOOLS SAMPLING INSPECTION PROCEDURES

PART 6 MILLING ARBORS AND ACCESSORIES

(*First Revision*)

1 SCOPE

This standard (Part 6) specifies sampling plans and procedures for milling arbors and accessories submitted for inspection in lots.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

<i>IS No.</i>	<i>Title</i>
2500 (Part 1) : 2000	Sampling inspection procedures: Part 1 Attribute sampling plans indexed by acceptable quality level (AQL) for lot-by-lot inspection (<i>third revision</i>)
4905 : 1968	Methods for random sampling

3 TERMINOLOGY AND DEFINITIONS

3.0 For the purpose of this standard the following definitions shall apply. For terms not defined below and for other clarifications, reference may be made to IS 2500 (Part 1).

3.1 Defect — A departure of a quality characteristic that results in a product, process or service not satisfying its intended normal usage requirements.

3.2 Non-Conformity — A departure of a quality characteristic that results in a product, process or service not meeting a specified requirement. Non-conformities will generally be established by their degree of seriousness, such as:

Class A	— Those non-conformities of a type considered to be of the highest concern for the product or service. In acceptance sampling, such types of non-conformity will be assigned very small AQL values.
Class B	— Those non-conformities of a type considered to have the next lower

degree of concern. Therefore these can be assigned a larger AQL value than those in Class A and smaller than in Class C, if a third class exists.

3.3 Non-Conforming Unit — A unit of product or service containing at least one non-conformity. Non-conforming units will generally be classified by their degree of seriousness such as:

Class A	— A unit which contains one or more non-conformities of Class A and may also contain non-conformities of Class B and/or Class C.
Class B	— A unit which contains one or more non-conformities of Class B and may also contain non-conformities of Class C, but contains no non-conformity of Class A.

3.4 Percent Non-Conforming — The percent non-conforming of any given quantity of units of products is 100 times the number of non-conforming units divided by the total number of units of products, that is:

Percent non-conforming

$$= \frac{\text{Number of non-conforming units}}{\text{Total number of units}} \times 100$$

3.5 Acceptable Quality Level (AQL) — When a continuous series of lots is considered, the quality level which for the purpose of sampling inspection is a limit of a satisfactory process average.

3.6 Sampling Plan — A specific plan which indicates the number of units of products from each lot which are to be inspected (sample size or series of sample sizes) and the associated criteria for determining the acceptability of the lot (acceptance and rejection numbers).

3.7 Lot — A collection of units of product from which a sample shall be drawn and inspected to determine conformance with the acceptability criteria, and which may differ from a collection of units designated as a lot for other purposes (for example, production, shipment, etc).

3.8 Sample — A sample consists of one or more units of product drawn from a lot, the units of the sample being selected at random without regard to their quality. The number of units of product in the sample is the sample size.

4 SCALE OF SAMPLING

4.1 All small tools shall be selected at random from a lot as per IS 4905 to ensure randomness of selection.

4.2 Small tools shall be selected and examined for each lot separately for ascertaining its conformity to the requirements of the relevant specification.

The number of small tools to be selected from a lot shall depend on the sizes of the lot and type of sampling plans and shall be in accordance with Tables 1, 2 and 3.

5 DETERMINATION OF ACCEPTABILITY

5.1 To determine acceptability of a lot under percent non-conforming inspection, the single sampling plan shall be used in accordance with 5.1.1 for hardness test and performance test and the double sampling plan shall be used in accordance with 5.1.2 for dimensional and visual characteristics.

5.1.1 Single Sampling Plan

The number of sample units inspected shall be equal to the sample size given by the plan. If the number of non-conforming units found in the sample is equal to or less than the acceptance number, the lots shall be

considered acceptable. If the number of non-conforming units is equal to or greater than the rejection number, the lot shall be considered not acceptable.

5.1.2 Double Sampling Plan

The number of sample units first inspected shall be equal to the first sample size given by the plan. If the number of non-conforming units found in the first sample is equal to or less than the first acceptance number, the lot shall be considered acceptable. If the number of non-conforming units found in the first sample is equal to or greater than the first rejection number, the lot shall be considered not acceptable.

If the number of non-conforming units found in the first sample is between the first acceptance and rejection numbers, a second sample of the size given by the plan shall be inspected. The number of non-conforming units found in the first and second samples shall be accumulated. If the cumulative number of non-conforming units is equal to or less than the second acceptance number, the lot shall be considered acceptable. If the cumulative number of non-conforming units is equal to or greater than the second rejection number the lot shall be considered not acceptable.

6 CLASSIFICATION OF NON-CONFORMITY

Non-conformities of various inspection parameters for milling arbors and accessories covered under various Indian Standards have been classified as Class A and Class B and are tabulated in Table 4.

Table 1 Scale of Sampling and Criteria for Conformity for Lot Quality for Visual and Dimensional Characteristics (Double Sampling Plan for Normal Inspection — Inspection Level III)
(Clause 4.2)

Sl No.	Lot Size	Sample	Sample Size	Cumulative Sample Size	Non-Conformity			
					Class A AQL 1.5		Class B AQL 4.0	
					Ac	Re	Ac	Re
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
i)	Up to 150	First	20	20	0	2	1	4
		Second	20	40	1	2	4	5
ii)	151 to 280	First	32	32	0	3	2	5
		Second	32	64	3	4	6	7
iii)	281 to 500	First	50	50	1	4	3	7
		Second	50	100	4	5	8	9
iv)	501 to 1 200	First	80	80	2	5	5	9
		Second	80	160	6	7	12	13
v)	1 201 to 3 200	First	125	125	3	7	7	11
		Second	125	250	8	9	18	19

Table 2 Scale of Sampling and Criteria for Conformity for Lot Quality for Hardness Test (Single Sampling Plan for Normal Inspections — Inspection Level I)
(Clause 4.2)

Sl No.	Lot Size	Sample Size	AQL 1.5	
			Ac	Re
(1)	(2)	(3)	(4)	(5)
i)	Up to 280	8	0	1
ii)	281 to 1 200	32	1	2
iii)	1 201 to 3 200	50	2	3

Table 3 Scale of Sampling and Criteria for Conformity for Lot Quality for Performance Test (Single Sampling Plan for Reduced Inspections — Inspection Level S-3)
(Clause 4.2)

Sl No.	Lot Size	Sample Size	AQL 4.0	
			Ac	Re
(1)	(2)	(3)	(4)	(5)
i)	Up to 150	2	0	1
ii)	151 to 3 200	5	0	2

Table 4 Classification of Non-Conformity in Milling Arbors and Accessories
(Clause 6)

Sl No.	IS No.	Type of Tool	Class A Non-Conformity	Class B Non-Conformity
(1)	(2)	(3)	(4)	(5)
i)	8614	Milling arbors with self release 7/24 taper	Hardness, 7/24 Taper shank and Diameter d	Dimensions $d_1, d_2, D_1, D_2, l, l_1, l_2, l_3, l_4$ and e
ii)	8615	Stub milling arbors with self release 7/24 taper—Arbor	Hardness, 7/24 Taper shank, d diameter and Dimensions a and b	Dimensions $D_1, d_1, d_2, l, l_1, l_2, c$, and L
		Detachable driving tenon	Dimensions J, B and K and Hardness	Dimensions A, C, D, E, F, G, S , and d
iii)	8616	Stub milling arbor with self release 7/24 taper and with key	Hardness, 7/24 Taper shank, Diameter d_1 and Dimensions b	Dimensions $l_2, l_3, l_4, l_5, d_2, d_3, d_4, k, s$ and e
iv)	8618	Spacing collars for milling arbors	Hardness and Diameters d, D_1 and D_2	Dimensions a, b, l_1 and l_2
v)	8619	Bearing collars for milling arbors	Hardness and Diameters d and D	Dimensions a, b and L
vi)	8620	Clamping nuts for milling arbors	Hardness and Dimension d_1	Dimensions D, L, S and l
vii)	8621	Retaining screws for milling arbors	Hardness and Dimension d_1	Dimensions a, b, d_2, k and l

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BUREAU OF INDIAN STANDARDS

Headquarters :

Manak Bhavan, 9 Bahadur Shah Zafar Marg, New Delhi 110 002
Telephones : 323 01 31, 323 33 75, 323 94 02

Telegrams : Manaksanstha
(Common to all offices)

Regional Offices :

	Telephone
Central : Manak Bhavan, 9 Bahadur Shah Zafar Marg NEW DELHI 110 002	{ 323 76 17 323 38 41
Eastern : 1/14 C.I.T. Scheme VII M, V. I. P. Road, Kankurgachi KOLKATA 700 054	{ 337 84 99, 337 85 61 337 86 26, 337 91 20
Northern : SCO 335-336, Sector 34-A, CHANDIGARH 160 022	{ 60 38 43 60 20 25
Southern : C.I.T. Campus, IV Cross Road, CHENNAI 600 113	{ 254 12 16, 254 14 42 254 25 19, 254 13 15
Western : Manakalaya, E9 MIDC, Marol, Andheri (East) MUMBAI 400 093	{ 832 92 95, 832 78 58 832 78 91, 832 78 92

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